



Dart Aerospace Ltd.
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2

D212-664-101TRN
Job Sheet 203699



Part No: D212-664-101TRN

Job Qty: 1 pcs

Part Name: Crosstube Turning Detail



Part Weight: 0 lbs

Status: New

Priority: Medium

Job Created: 11/25/19

Job Tracking No:

Due Date: 12/6/19

Created By: Marie Lajeunesse

Type: Stock

Description:

Note: DWG REV E IPP Rev:A 08-03-06 new issue DD verified by:ec IPP Rev B 08.04.02 removed Polish EC verified by: DD

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Sign-off
					Setup Hrs	Run Hrs	Workcenter / Supplier	Lead Time	
100	Mori Seiki TL-40 - 1	1 pcs		12/6/19	1.00	2.38	Mori Seiki TL-40 - 1		BS 2019/12/12
110	QC 2	1 pcs		12/6/19	0.00	0.00	QC 2 - 1		
							QC 2 - 12		
							QC 2 - 14		
							QC 2 - 17		
							QC 2 - 19		
							QC 2 - 2		
							QC 2 - 20		
							QC 2 - 22		
							QC 2 - 23		
							QC 2 - 25		
							QC 2 - 32		
							QC 2 - 33		
							QC 2 - 35		
							QC 2 - 39		
							QC 2 - 4		
							QC 2 - 40		
							QC 2 - 44		
							QC 2 - 45		
							QC 2 - 48		
							QC 2 - 49		
							QC 2 - 50		
							QC 2 - 51		
							QC 2 - 52		
							QC 2 - 57		
							QC 2 - 62		
							QC 2 - 63		
							QC 2 - 8		
							QC 2 - 66		BS 2019/12/12
							QC 2 - 64		

Plex 11/25/19 3:06 PM Dart.lajeunesse.marie

				QC 2 - 65	
				QC 2 - 5	
				QC 2 - 71	
				QC 2 - 73	
				QC 2 - 69	
120	Mori Seiki TL-40 - 1 - B4B	1 pcs	12/6/19	1.00 2.38	Mori Seiki TL-40 - 1 - B4B
130	QC 2	1 pcs	12/6/19	0.00 0.00	QC 2 - 1
					QC 2 - 12
					QC 2 - 14
					QC 2 - 17
					QC 2 - 19
					QC 2 - 2
					QC 2 - 20
					QC 2 - 22
					QC 2 - 23
					QC 2 - 25
					QC 2 - 32
					QC 2 - 33
					QC 2 - 35
					QC 2 - 39
					QC 2 - 4
					QC 2 - 40
					QC 2 - 44
					QC 2 - 45
					QC 2 - 48
					QC 2 - 49
					QC 2 - 50
					QC 2 - 51
					QC 2 - 52
					QC 2 - 57
					QC 2 - 62
					QC 2 - 63
					QC 2 - 8
					QC 2 - 66
					QC 2 - 64
					QC 2 - 65
					QC 2 - 5
					QC 2 - 71
					QC 2 - 73
					QC 2 - 69
140	QC 8	1 pcs	12/6/19	0.00 0.00	QC 8 - 12
					QC 8 - 14
					QC 8 - 17
					QC 8 - 20
					QC 8 - 25
					QC 8 - 3
					QC 8 - 32
					QC 8 - 33
					QC 8 - 35
					QC 8 - 39
					QC 8 - 4
					QC 8 - 44
					QC 8 - 45
					QC 8 - 49
					QC 8 - 58
					QC 8 - 8
					QC 8 - 9
					QC 8 - 68

DAS

66

9-89

DAS

66

9-89

					QC 8 - 67	
					QC 8 - 1 (A)	
					QC 8 - 47	19-12-19
					QC 8 - 40	
					QC 8 - 52	
					QC 8 - 23	
					QC 8 - 57	
					QC 8 - 76	
					QC 8 - 61	
145	Crosstubes - 2 - B4B	1 pcs	12/6/19	0.00 0.50	Crosstubes - 1 - B4B	BB 12/30/19
					Crosstubes - 2 - B4B	
					Crosstubes - 3 - B4B	
					Crosstubes - 4 - B4B	
150	Handfinish - 1-1 Chemical-B4B	1 pcs	12/6/19	0.00 1.00	Handfinish - 1 - 1 - B4B	★ JAN 02 2020
					Handfinish - 1 - 2 - B4B	
					Handfinish - 1 - 3 - B4B	
					Handfinish - 1 - 4 - B4B	
					Handfinish - 1 - 5 - B4B	
					Handfinish - 1 - 6 - B4B	
					Handfinish - 1 - 7 - B4B	
					Handfinish - 1 - 8 - B4B	
					Handfinish - 1 - 9 - B4B	
					Handfinish - 1 - 10 - B4B	
					Handfinish - 1 - 11 - B4B	
					Handfinish - 1 - 12 - B4B	
					Handfinish - 1 - 13 - B4B	
					Handfinish - 1 - 14 - B4B	
					Handfinish - 1 - 15 - B4B	
					Handfinish - 1 - 16 - B4B	
					Handfinish - 1 - 17 - B4B	
					Handfinish - 1 - 18 - B4B	
					Handfinish - 1 - 19 - B4B	
					Handfinish - 1 - 20 - B4B	
					Handfinish - 1 - 21 - B4B	
					Handfinish - 1 - 22 - B4B	
160	QC 7	1 pcs	12/6/19	0.00 0.00	QC 7 - 10	
					QC 7 - 13	
					QC 7 - 14	
					QC 7 - 15	
					QC 7 - 17	
					QC 7 - 18	
					QC 7 - 19	
					QC 7 - 2	
					QC 7 - 28	
					QC 7 - 3	
					QC 7 - 30	
					QC 7 - 34	
					QC 7 - 36	
					QC 7 - 37	
					QC 7 - 41	
					QC 7 - 47	
					QC 7 - 48	
					QC 7 - 51	
					QC 7 - 58	
					QC 7 - 59	
					QC 7 - 60	
					QC 7 - 9	
					QC 7 - 68	
					QC 7 - 50	

Part Op 100 - (Mori Seiki CNC Lathe Large) 1- Fill tube with sand & install plugs 212-141 on both ends as per Folio FA113 3- Turn Descriptions: first taper section on both side as per folio FA113

110 - (QC2- Inspect parts off machine FAI/FAIB) (QC2- Inspect parts off machine FAI/FAIB)

120 - (Mori Seiki CNC Lathe Large) 1- Turn second taper on both side 4- Scribe part # and batch # using vibrating stylus on the cuff as per Dwg D212-664-141

130 - (QC2- Inspect parts off machine FAI/FAIB)

140 - (QC8- Inspect parts - second check)

145 - (Crosstubes) GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.

150 - 1- Handfinish X-TUBE INSIDE AND OUT

160 - (QC7-Inspect Chemical Conversion Coat)

170 - (Identify as per dwg & Stock Location: _____ LOCATION : LG014

180 - (QC21- Final Inspection - Work Order Release)

Job BOM				
Part / Item	Component Name	Quantity	Operation	Container
D6005-128	Crosstube Material	1 pcs (1 ea)	100-Mori Seiki TL-40 - 1	F139415

Job Allocations				
Operation	Component Part	Required	Inventory	Allocated
100-Mori Seiki TL-40 - 1	D6005-128	1	8	0

Part Specifications
Specifications could not be found.



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Plex 11/25/19 3:06 PM Dart.lajeunesse.marie

Container No: S239843



Part: D212-664-101TRN

Job No: 203699

Serial No/Batch: S239843

Revision: E

Inspector:

Exp Date:

Instructions:

Date: 12/12/19

②

DART AEROSPACE LTD	Work Order:	203699
Description: Crosstube Assembly (205/212/412 High Fwd)	Part Number:	D212-664-141
Inspection Dwg: D212-664-141 Rev: E		Page 1 of 2

FIRST ARTICLE INSPECTION CHECKLIST

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.200	+/-0.010	.204	✓		CNC-08	
	R0.063	+/-0.010	.067	✓		RG	
	2.740	+0.005/-0.000	2.738	✓	✓	CNC-04	OK JTW
	5.097	+/-0.030	5.097	✓		CNC-08	
	2.304	+0.005/-0.000	2.312	✓	✓	CNC-04	OK JTW
	2.340	+0.005/-0.000	2.341	✓			
	2.398	+0.005/-0.000	2.403	✓			
	2.448	+0.005/-0.000	2.453	✓			
	2.498	+0.005/-0.000	2.503	✓			
	2.549	+0.005/-0.000	2.554	✓			
	2.599	+0.005/-0.000	2.604	✓			
	2.671	+0.005/-0.000	2.676	✓			
	2.701	+0.005/-0.000	2.705	✓			
SIDE B	0.200	+/-0.010	.200	✓		CNC-08	
	R0.063	+/-0.010	.063	✓		RG	
	2.740	+0.005/-0.000	2.741	✓		CNC-04	
	5.097	+/-0.030	5.096	✓		CNC-08	
	2.304	+0.005/-0.000	2.309	✓		CNC-04	
	2.340	+0.005/-0.000	2.345	✓			
	2.398	+0.005/-0.000	2.403	✓			
	2.448	+0.005/-0.000	2.453	✓			
	2.498	+0.005/-0.000	2.503	✓			
	2.549	+0.005/-0.000	2.553	✓			
	2.599	+0.005/-0.000	2.606	✓	✓		OK JTW
	2.671	+0.005/-0.000	2.676	✓			
	2.701	+0.005/-0.000	2.704	✓			
	126.514	+/-0.020	126.510	✓		Tape	

Item	Qty	Qty	Qty	Part Number	Description
	-141	-141B	-141F		
1	X			D212-884-141	CROSS TUBE ASSEMBLY (205/212/12412 HIGH FWD)
2		X		D212-884-141B	CROSS TUBE ASSEMBLY (214 HIGH FWD)
3			X	D212-884-141F	CROSS TUBE ASSEMBLY (205/212/12412 HIGH FWD) (ANODIZED)
4	1	1	1	D2005-128	CROSS TUBE
5	2	2	2	D2003-1	SUPPORT
6	4	4	4	D3085-003-450	RUBBER CUSHION
7	2	2	2	D6017-1	SUPPORT
8	4	4	4	MS21820-25	CLAMP (OR MS21820-26)
9	AR	AR	AR	PROSEAL 880 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6005-128
- 2) FINISH -141 & -141B: a) CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
b) PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
c) MASK UNDERSIDE OF CROSS TUBE AS SHOWN (ZN C8-2 / C8-3, HATCHED AREA)
d) PAINT OUTSIDE PER DART QSI 005 4.2
e) REMOVE MASKING AND APPLY MATTE CLEAR COAT
- 3) FINISH -141F: a) ANODIZE PER MIL-A-8625, TYPE II, CLASS 1.
b) ALODINE (DO NOT ETCH) PER QSI 005 4.1.2
c) PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
d) MASK UNDERSIDE OF CROSS TUBE AS SHOWN (ZN C8-2 / C8-3, HATCHED AREA)
e) PAINT OUTSIDE PER DART QSI 005 4.2
f) REMOVE MASKING AND APPLY MATTE CLEAR COAT

*NOTE: BETWEEN FINISHING OPERATIONS EXTREME CARE MUST BE TAKEN NOT TO CONTAMINATE OR DAMAGE FINISHED SURFACES.

- 4) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-884-XXX" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS
- 7) WEIGHT: D212-884-141/141B/141F = 33.6 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLEND OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

MACHINING

- 10) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.

BENDING

- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7.2% (BASED ON O.D.) IN LOWER HALF OF R35.5 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- 12) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSS TUBE PER QSI 038.

ASSEMBLY

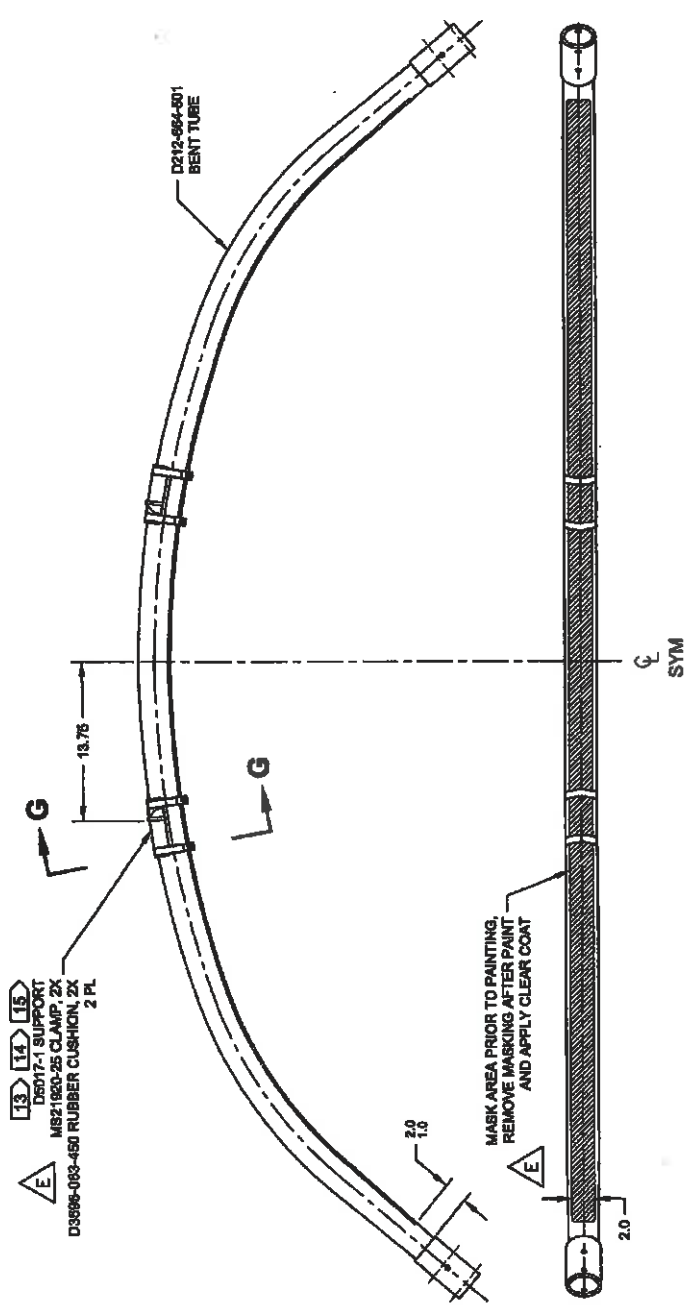
- 13) TO INSTALL D2885-1 / D6017-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSS TUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT), APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 880 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 14) INSTALL MS21820-25 CLAMPS (OR -26) WITH D3585-003-450 RUBBER CUSHIONS TO SECURE THE SUPPORT ON TOP SIDE OF THE CROSS TUBE. ENSURE CLAMPS ARE ON TOP SIDE OF CROSS TUBE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 880 SEALANT HAS CURED FOR 72 HOURS.

SHOP COPY
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SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 003699 M05
19-1-25

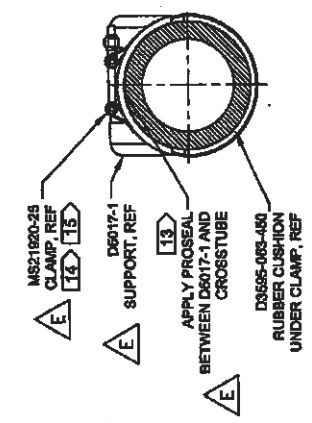
RELEASED
2016-05-26
JMD

E	ADD -141F, D6017-1 WAS D2885-1 (-141B), PROSEAL WAS MAGNABOND, NOTE 2: ADD INSPECTION WINDOW, NOTE 11: ALLOW 7.2% CRUSH, NOTE 1E: ADD 72HR CURE AND RETORQUE FOR PROSEAL, ADD SHEET 3, CLAMPS REVERSED TO PREVENT CHAFING (B7-2, B7-3), BEND HEIGHT TOL. NOW 0.25 WAS 0.15 (C1-3), INCOMP. DEC D-12/23	CP	14.04.01
D	REFORMAT/REVISE GENERAL NOTES/PART LIST: REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -141B (ZN B4-2, D4-2); REMOVED REF & ADD TOLERANCES (ZN B4-3, C8-3, C8-3 & B6-3); RELOCATED FLAG #6 PER PAR 06-08 (ZN A8-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	08.09.20
C	REMOVE -481 ABRASION STRIP; ADD MAGNABOND 8396, CUSHION, REVERSE CLAMPS	PH	07.08.08
B	ADD HOLE FOR COMPATIBILITY WITH BHTMA SKID TUBES	PH	06.02.04
A	NEW ISSUE	CP	03.12.12
REV.	DESIGN	BY	DATE
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	14.04.01		
DART AEROSPACE LTD HARRISBURG, ONTARIO, CANADA			
DRAWING NO. D212-884-141			
TITLE XTUBE ASSY (205/212/12412 HI FWD)			
SHEET 1 OF 5			
SCALE			
NTS			
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R 2014-05-26



D212-684-141B
ASSEMBLY DETAIL

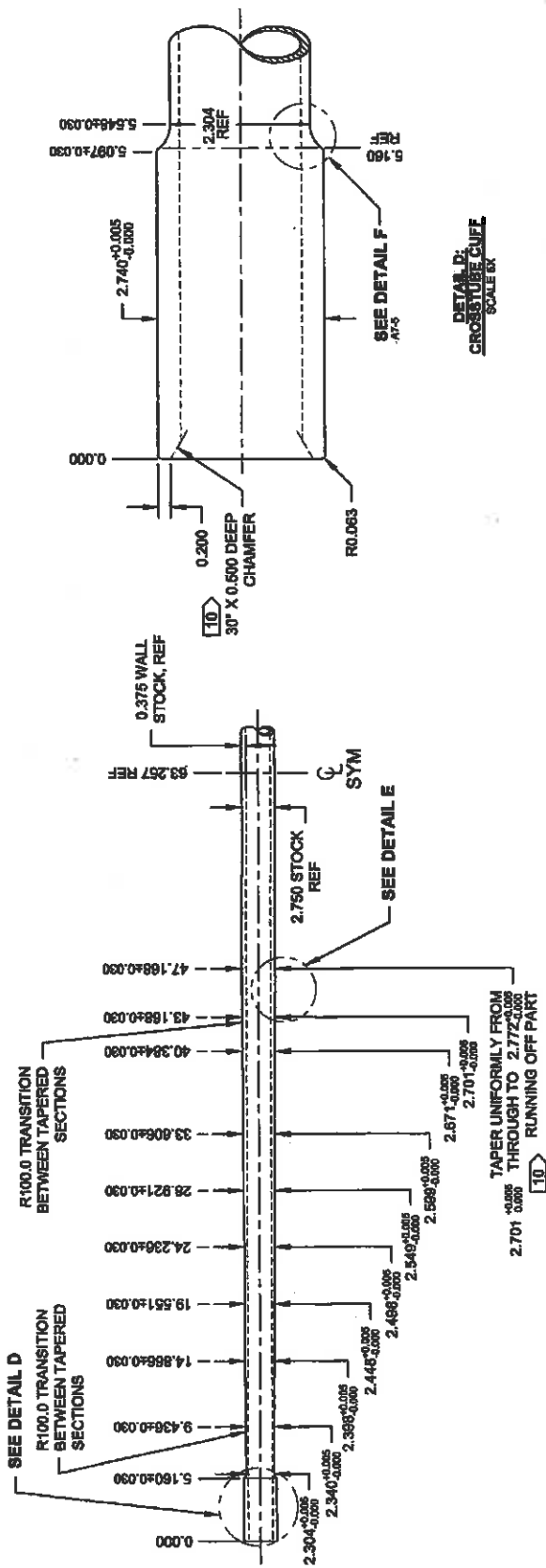


SECTION G-G
SCALE 4X

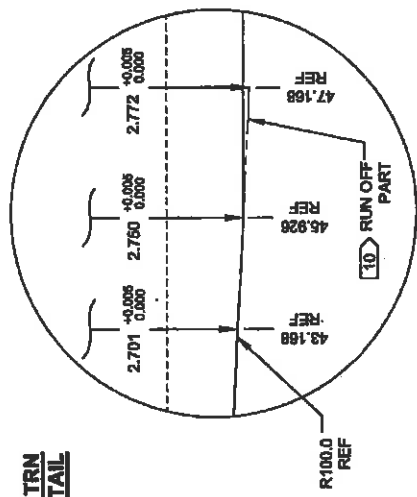
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DRAWN	D	HAYNESBURY, ONTARIO, CANADA	
CHECKED	D	DRAWING NO.	SHEET 3 OF 3
MFG. APPR.	D	D212-684-141	SCALE
APPROVED	D	TITLE	NTS
DE APPR.	D	XTUBE ASSY (205/212/412 HI FWD)	
DATE	14.04.01	COPYRIGHT © 2004 BY DART AEROSPACE LTD	

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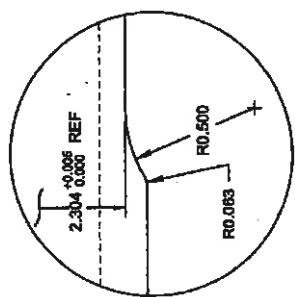
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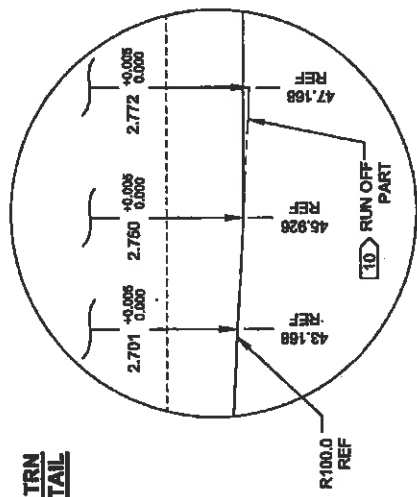
D212-684-141TRN
TURNING DETAIL



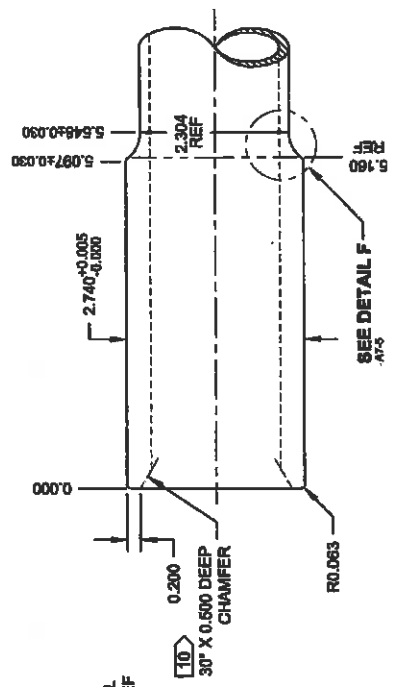
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CUFF TRANSITION
SCALE 10X



DETAIL E:
TAPER RUN-OFF
NOT TO SCALE



DETAIL D:
CROSS-TUBE CUFF
SCALE 6X



RELEASED
2014-05-26

DESIGN	00	DART AEROSPACE LTD
DRAWN	00	HAWKSBURY, ONTARIO, CANADA
CHECKED	00	DRAWING NO.
MFG. APPR.	00	D212-684-141
APPROVED	00	TITLE
DE APPR.	00	XTUBE ASSY (205/212/412 HI FWD)
DATE	14.04.01	NTS

REV. E
SHEET 5 OF 5
SCALE
NTS

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Entered: _____ Date: _____

WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

Route update only ☐

NCR No. _____

Job: _____ Part No. _____		DISPOSITION			DEPARTMENT/PROCESS			MRB (QS1042)																
Date: _____		Sequence #: _____			QTY Affected: _____			Completed By																
Description Work Order Deviation		Disposition			Lead hand / Supervisor		QC / QA Coordinator																	
Root Cause <table border="1"><tr><td>Operator</td><td></td></tr><tr><td>Manufacturing Process</td><td></td></tr><tr><td>Equip/Tooling</td><td></td></tr><tr><td>Handling/Preservation</td><td></td></tr><tr><td>Material</td><td></td></tr><tr><td>Product Improvement</td><td></td></tr><tr><td>Process Improvement</td><td></td></tr><tr><td>Human Factors</td><td></td></tr></table>		Operator		Manufacturing Process		Equip/Tooling		Handling/Preservation		Material		Product Improvement		Process Improvement		Human Factors		FAULT CATEGORY						
		Operator																						
Manufacturing Process																								
Equip/Tooling																								
Handling/Preservation																								
Material																								
Product Improvement																								
Process Improvement																								
Human Factors																								
		Pressure/Forced		Contamination		Power Loss/Surge		Positioned Wrong																
		Bending		Misaligned/off center		Folio/Program		Outside Tolerance																
		Crushing		BOM/Route		Grain Direction		Drawing																
		Cracks		Broken/Damage/Defect		Weld		Finish																
		Crimp/Kink/Ripple/Wave/Twist		Incomplete/Unclear Instructions		Wrong Stock Pulled		Part Lost/Missing																
		Marks/Chatter		Drill Holes		Out of Sequence		Misread																
		Mislabeled		Fit/Function		Off-set/Set-up																		
		Other/Details: _____																						